

Supplemental Material to:

A Physiologically-Based Pharmacokinetic Model for the Assessment of Infant Exposure to Persistent Organic Pollutants in Epidemiologic Studies

Marc-André Verner¹, Pierre Ayotte², Gina Muckle², Michel Charbonneau³, Sami Haddad¹

¹Département des sciences biologiques, TOXEN, Université du Québec à Montréal, Montréal, Québec (Canada)

²Centre de recherche du CHUQ-CHUL, Université Laval, Québec, Québec (Canada)

³INRS-Institut Armand-Frappier, Université du Québec, Laval, Québec (Canada)

This work was performed at:

Université du Québec à Montréal
C.P.8888 Succ. Centre-ville
Montréal (Québec)
Canada
H3C 3P8

Correspondence should be addressed to:

Sami Haddad
Université du Québec à Montréal
C.P.8888 Succ. Centre-ville
Montréal (Québec)
Canada
H3C 3P8
Telephone: 514-987-3000 ext. 2451
Fax: 514-987-4647
haddad.sami@uqam.ca

Sensitivity analysis

The sensitivity analysis was carried out by assessing the impact of a 10% increase in parameter values on lipid adjusted blood concentration of PCB153 or area under the curve (AUC) in infants for the first year of life. The scenario of a 25 year old woman giving birth to an infant and breastfeeding for 6 months was used for this exercise. Figure 1 is a graphical representation of the sensitivity analysis that we performed:

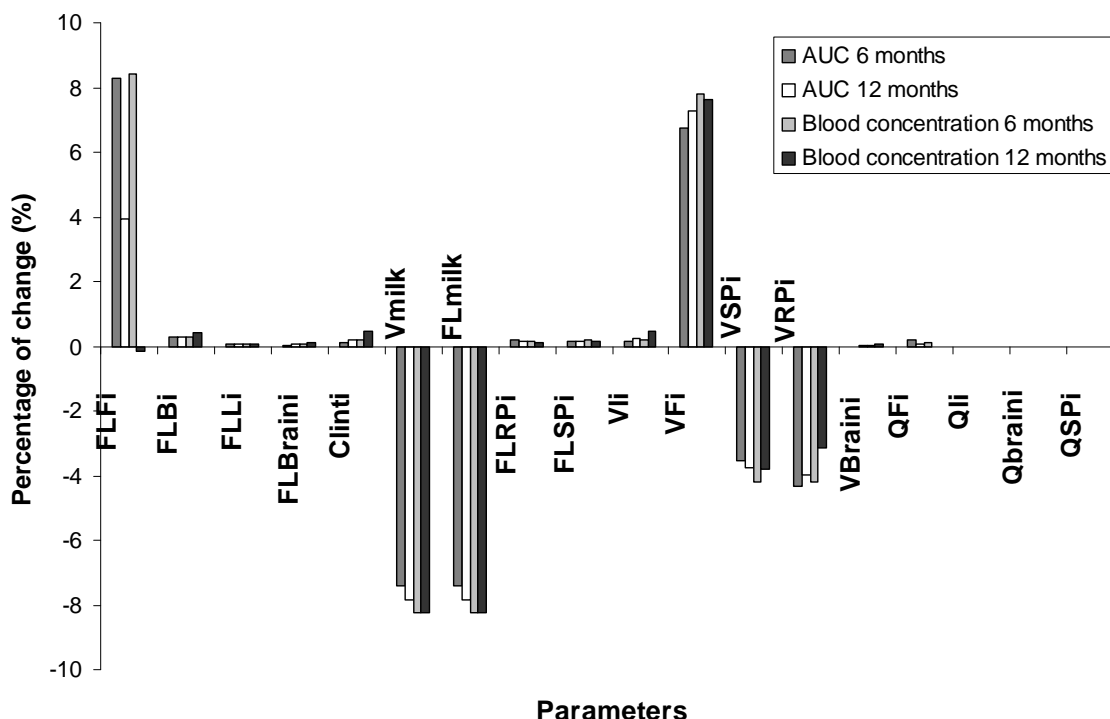


Figure 1. Sensitivity analysis for infant parameters. The impact of a 10% increase in parameter value on blood PCB153 level is displayed as a percentage of change in the AUC for the first 6 months (dark grey bars) and 12 months of life (white bars), as well as blood PCB153 concentration at 6 months (light grey bars) and 12 months (black bars). Parameter abbreviations: FLFi = fraction of lipids in adipose tissue, FLBi = fraction of lipids in blood, FLLi = fraction of lipids in liver, FLBraini = fraction of lipids in brain, FLBi = fraction of lipids in blood, FLRPi = fraction of lipids in richly perfused tissues, FLSPi = fraction of lipids in slowly (poorly) perfused tissues, Vmilk = volume of breast milk ingested by day, FLmilk = fraction of lipids in breast milk, Vli = volume of liver, Vfi = volume of adipose tissue, VSPi = volume of slowly (poorly) perfused tissues, VRPi = volume of richly perfused tissues, VBraini = volume of brain.

Results show that independent parameters FLFi, Vmilk and FLmilk have a strong influence on lipid adjusted blood concentration and AUC in infant. The figure also presents sensitivity for dependant parameters VFi, VSPi and VRPi. POPs being highly distributed mainly in the adipose tissue compartment, it is not surprising that the volume of this compartment (VFi) has an effect on blood levels. On the other hand, VSPi and VRPi appear to be sensitive but their impact can be explained by the fact that they are used in the calculation of VFi. VFi was not included in the Monte Carlo analysis because of the inter-dependence between this parameter and many others (changing the volume of it would affect other parameters).